

Delta Operations for Salmonids and Sturgeon (DOSS) Group
Conference call: 1/2/2019 at 2:30 p.m.

Objective: Provide advice to the Water Operations Management Team (WOMT) and National Marine Fisheries Service (NMFS) on measures to reduce adverse effects from Delta operations of the Central Valley Project and the State Water Project on salmonids and green sturgeon. DOSS will work with other technical teams. DOSS notes and advice can be found at: http://www.westcoast.fisheries.noaa.gov/central_valley/water_operations/doss.html.

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NMFS: Kristin Begun

Reclamation: Elissa Buttermore, Tom Patton, Towns Burgess

Agenda Items

1. Agenda review and introductions
2. RPA Implementation review (For the DOSS Dashboard, click on the "Triggers & Indices" tab at: www.baydeltalive.com/djfmj)
3. Current Operations
4. Smelt Working Group
5. Fish Monitoring: RSTs/trawls/seines
6. Fish Monitoring: Salvage
7. Winter-run JPE and fish loss density triggers
8. Hatchery Release
9. DOSS Estimates of Fish Distribution
10. DOSS Feedback on Entrainment Risk
11. DOSS advice
12. Next DOSS meeting

Agenda Item 2.

RPA Implementation Review

Delta RPA Actions affecting operations during December/January:

Action IV.1.1 (Alerts that indicate the Delta Cross Channel (DCC) gate operations may be triggered soon)¹:

- Starting on 10/1, the First Alert is triggered if either the first component (>95 cfs flow threshold) or second component (>50% change in mean daily flow) has been exceeded at either the Deer Creek gage at Vina (DCV), or the Mill Creek gage at Los Molinos (MLM). See table below for details.

¹ For details, see pages 60-61 in Enclosure 2 of the 2011 Amendments to the 2009 RPA document at: http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711_ocap_opinion_2011_amendments.pdf. Note that in October 2014, NMFS approved a modification of the first component of the first alert to a 95 cfs mean daily flow threshold in either Mill Creek or Deer Creek in lieu of operating the Mill and Deer Creek rotary screw traps.

Mill Creek (MLM)			Deer Creek (DCV)	
Date	mean daily flow (cfs)	change in mean daily flow	mean daily flow (cfs)	change in mean daily flow
12/25/18	116	-80%	600	92%
12/26/18	116	0%	326	-46%
12/27/18	117	1%	242	-26%
12/28/18	117	0%	199	-18%
12/29/18	188	61%	173	-13%
12/30/18	250	33%	160	-8%
12/31/18	876	250%	150	-6%

- Second Alert (triggered only if both Knights Landing water temperatures are <56.3°F and Wilkins Slough flows are >7,500 cfs). The second alert was triggered 6 of 7 days last week. See table below for details.

Wilkins Slough (WLK)		Knights Landing (KL)
Date	Mean Daily Flow (cfs)	Daily water temperature (°F)
12/25/18	7,622	*
12/26/18	13,855	50.1
12/27/18	12,776	*
12/28/18	9,820	48.1
12/29/18	8,194	*
12/30/18	7,317	*
12/31/18	6,738	46.7

*Knights Landing temperatures were only available for 12/26, 12/28, and 12/31, but were assumed to be below 56.3°F every day last week.

Action IV.1.2² (DCC gate operations):

- DCC gates will remain closed per operations described in RPA IV.1.2 starting 12/1/18.

Action IV.2.3³ (OMR Management):

- Implementation of this action in WY 2018 began on 1/1/19, and requires that Old and Middle River (OMR) flow be no more negative than -5,000 cfs. OMR flows are reported weekly with the OMR index and the tidally filtered USGS gauges at the 5-day and 14-day running averages.

Action IV.3³ (Reduce likelihood of entrainment or salvage at the export facilities, including an alert that indicates that export operations may need to be altered):

² For details, see pages 62-66 in Enclosure 2 of the 2011 Amendments to the 2009 RPA document at: http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711_ocap_opinion_2011_amendments.pdf

The third alert [November 1-February 28 Knights Landing Catch Index (KLCI) or Sacramento Catch Index (SCI) >10] was not triggered this past week. However, the Knight Landing RST monitoring program exceeded the take limit on 12/20 and did not sample for most of the past week. Therefore, data were incomplete to calculate KLCI and fully assess if the third alert had been triggered during the past week.

- Since the action went into effect on 11/1/18, no salvage-based triggers that would require export reduction have been exceeded.

Agenda Item 3.

Current Operations (1/2/19)

SWP		CVP	
Exports (cfs)			
Clifton Court Forebay	2,200	Jones Pumping Plant	3,500
Reservoir Releases (cfs)			
Feather - Oroville	1,750	American - Nimbus	1,750
		Sacramento - Keswick	4,000
		Stanislaus - Goodwin	200
		Trinity - Lewiston	300
Reservoir Storage (in TAF)			
San Luis (SWP)	868	San Luis (CVP)	638
Oroville	1,032	Shasta	2,270
New Melones	1,790	Folsom	311
Delta Operations			
DCC	Closed	Sacramento River at Freeport (cfs)	12,943
Outflow Index (cfs)	~8,500	San Joaquin River at Vernalis (cfs)	1,148
E:I	40% (14-day avg.)	X2	>81 km

Factors controlling Delta exports:

- 12/18/18-12/31/18: salinity management
- Starting 1/1/19: -5,000 cfs OMR limit per NMFS BiOp RPA Action IV.2.3

Approximate OMR as of 12/30/18:

	USGS gauges (cfs)	Index (cfs)
Daily	-7,900	-7,700
5-day	-6,400	-7,200
14-day	-6,200	-6,800

Approximate OMR as of 1/1/19:

³ For details, see pages 79-80 in Enclosure 2 of the 2011 Amendments to the 2009 RPA document at: http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711_ocap_opinion_2011_amendments.pdf

	Index (cfs)
Daily	-4,900
5-day	-7,100
14-day	-7,000

Weather Forecast

The forecast indicates dry conditions today and Thursday. A storm system is expected to bring significant precipitation on Friday night and Saturday. Half an inch to an inch of rain possible in the Sacramento valley. One to 2 feet of snow may occur in the mountains above 4,000 feet.

Another storm system possible on Monday and Tuesday.

Agenda Item 4.

Smelt Working Group

The Smelt Working Group met on Monday, 12/31/18. A meeting summary was not available at the time of the DOSS call, however, no significant changes were made from the previous meeting.

Agenda Item 5.

Fish Monitoring: The following table presents fish monitoring data summarized over the past week. Unless otherwise noted, reported sizes are fork length. Empty cells indicate zero catches at those locations with sample dates shown.

Location	GCID RST ^A	Tisdale RST ^B	Knights Landing RST ^C	Beach Seines ^D	Sacramento Trawl ^D	Chippis Is. Midwater Trawl ^D	Mossdale Kodiak Trawl ^D
Sample Date	12/23-1/2	12/23-12/31	12/16-12/20	12/24-12/25, 12/27	12/23, 12/26-12/29	12/23, 12/26-12/29	12/24, 12/26, 12/28
FR Chinook	173	49	114	82	7		
SR Chinook	8	3	64	12			
WR Chinook	35	11	96	24	1		
LFR Chinook	22		3			4	
Chinook (ad-clip)	17	2	3		2	43	
Steelhead (wild)							
Steelhead (ad-clip)							
Green Sturgeon							
Flows (avg. cfs)	919	7,829	10,122				
W. Temp. (avg. °F)	49.2	48	50.9				
Turbidity (avg.)	11.2	22.2	25.54				

NTU)							
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^A The GCID RST was raised on 12/24 due to predicted high flows and heavy debris and sampling resumed on 12/29.

^B Tisdale RST sampling period was from 12/23 at 9:30 am to 12/31 at 9:30 am. RST cone sampling efforts were reduced to 50% due to previous high catch.

^C Knights Landing RST sampling period was from 12/16 at 11:16 am to 12/20 at 12:15 am. Knights Landing RST sampling was interrupted by take exceedance, but resumed on 1/1/2019.

^D Data reported in the 12/23 to 12/29 DJFMP sampling summary.

Enhanced Delta Smelt Monitoring (EDSM):

Three ad-clipped Chinook salmon were caught in the EDSM sampling at Cache Slough and Suisun Marsh.

Red Bluff Diversion Dam (RBDD)

USFWS biweekly report (12/17/18-12/31/18) for preliminary estimates of passage by brood-year and run for unmarked juvenile Chinook salmon captured by rotary screw traps at RBDD included:

Run and Species	Biweekly Total	Brood Year Total (90% CI)
Winter-run Chinook (BY2018)	12,745	1,115,920 (784,491-1,447,349)
Spring-run Chinook (BY2018)	1,216	134,682 (83,451-185,912)

CDFW carcass surveys

- ***San Joaquin River tributaries:*** Chinook salmon carcass surveys, with incidental redd counts, began the week of 10/1/18 on the Merced River, Tuolumne River, and Stanislaus River. CDFW has completed the ninth week of surveys. No data were collected this week.
- ***American River:*** Chinook salmon carcass surveys began on Monday, 10/15/18. The survey area is from Nimbus Dam to Watt Avenue. The Nimbus Basin was closed to all fishing on 3/1. Chinook salmon spawning is currently monitored in this area. From 12/17 to 12/28, 2,926 total fish were observed between Nimbus Dam and the Fair Oaks Bridge (797 at Nimbus Basin, 1,479 at section 1A, 357 at section 1B, 247 at section 2, and 46 at section 3). The weir was pulled out during the week of 12/10 and is no longer part of the survey. 24 of 281 female carcasses observed were unspawned, 21 were partially spawned, 174 were spawned, and 65 were unknown due to deteriorated condition. Water temperatures in the survey reaches were a mean of 51.4°F at the farthest point upstream at the Hazel Avenue Bridge.

Stanislaus River weir

Monitoring at the weir near Riverbank (for upstream passage of adult salmonids) began on 9/5/18. No updates were provided for this week's DOSS call.

Acoustic-tagged green sturgeon

CDFW has acoustic-tagged 35 juvenile sturgeon (30 green sturgeon and 5 white sturgeon) captured between 7/24/18 and 12/13/18 near Sherman Lake on the Sacramento River (western Delta). Fork lengths of these fish range between 39 cm and 94 cm. 26

individuals have been detected (near the Sherman Lake tagging location) between 8/14/18 and 12/13/18. No updates were provided for this week's DOSS call.

Other Surveys

The following fish hatchery spawning data are provided to inform DOSS members of potential hatchery influence on catch numbers at monitoring locations. Data from additional hatchery spawning programs and other carcass surveys may be provided in the future as they become available to DOSS.

- **Feather River Fish Hatchery Spawning**

No updates were provided for this week's DOSS call.

- **Mokelumne River Fish Hatchery**

On 12/11, the Mokelumne River Fish Hatchery satisfied its egg take goal this season of 6.82 million fall-run Chinook salmon eggs. Steelhead egg take has initiated at the Mokelumne River Fish Hatchery. The seasonal egg take goal is 400,000; this number will be achievable using fish entering the hatchery this season along with broodstock already at the hatchery held over from last season.

- **Nimbus Fish Hatchery**

Last updated from 12/19, the last fall-run Chinook salmon pair was spawned 12/13 and approximately 8.4 million eggs were collected this season. As of 12/19, 13 steelhead pairs have been spawned.

Agenda Item 6.

Fish Monitoring: Salvage

Griffiths (CDFW) provided a salvage summary for the period of 12/24-12/30.

Hatchery origin winter-run and late-fall run sized Chinook salmon were salvaged at the Tracy Fish Collection Facility. After expansion due to subsampling, 88 total clipped fish were salvaged (28 winter-run-sized, 60 late-fall-run sized). One wild (non-clipped) winter-run sized Chinook salmon was observed on 12/29, and was expanded to an expected salvage of 4. The loss density for 12/29 was calculated to be 0.33 fish/TAF (Thousand Acre Feet).

No salmonids were salvaged at the Skinner Fish Protective Facility this past week. No sturgeon were observed in salvage this past week.

Counts were reduced at the state facility due to high salvage rates and high weed flow on 12/27-12/29. High fish numbers were salvaged on the evening of 12/27 to early morning 12/28, coincident with high winds and turbidity at the facility (personal observation during site visit).

No reduced counts occurred at the federal facility.

DOSS Weekly Salvage Update

Reporting Period: December 24-December 30, 2018

Prepared by Kyle Griffiths on December 31, 2018 10:04 am

Preliminary Results - Subject to Revision

Criteria	24-Dec	25-Dec	26-Dec	27-Dec	28-Dec	29-Dec	30-Dec	Trend	
Loss Densities									
Wild older juvenile CS	0	0	0	0	0	0.33	0	→	0.00
Wild steelhead	0	0	0	0	0	0	0	→	0.00
Exports									
SWP daily export	6,502	7,526	6,570	6818	7,919	8,530	10,383	↗	7,750
CVP daily export	7,895	7,944	7,877	7,907	8,069	7,955	8,023	↗	7,953
SWP reduced counts	0	0	0	33%	54%	8%	0	↗	14%
CVP reduced counts	0	0	0	0	0	0	0	→	0

Loss Density = fish lost/TAF; water export = AF; Trend = compared to previous week; wild = adipose fin present

Loss = estimated number of fish lost at the CVP and SWP Delta export facilities based on estimated salvage (see below)

Reduced counts = percentage of time that routine salvage sample time were less than 30 min per 2 hours of salvage and export operations

Yellow highlighted dates indicate TFCF salvage outage occurred

Chinook Salmon Weekly/Season Salvage and Loss

Combined salvage and loss for both CVP and SWP fish facilities

Race determined by size at date of capture; hatchery = adipose fin missing;

Category	Weekly Total			Season Total	
	Salvage	Loss	Trend	Salvage	Loss
Wild					
Winter Run	4	2.6	↗	4	2.6
Spring Run	0	0	→	0	0
Late Fall Run	0	0	↘	6	13.8
Fall Run	0	0	→	0	0
Unclassified	0	0	→	0	0
Total	4	2.6		10	16.4
Hatchery					
Winter Run	28	18.2	↗	28	18.2
Spring Run	0	0	↘	8	5
Late Fall Run	60	39.4	↗	76	66.9
Fall Run	0	0	→	0	0
Unclassified	0	0	→	0	0
Total	88	57.6		112	90.1

Trend = weekly loss per race; Salvage = estimated number of fish collected by the CVP and SWP fish protective facilities per unit of time

NC = cannot be calculated; hatchery salmon salvage and loss estimates have been corrected using CWT readings when available

Steelhead Weekly/Season Salvage and Loss

Combined salvage and loss for both CVP and SWP fish facilities

Category	Weekly Total			Season Total	
	Salvage	Loss	Trend	Salvage	Loss
Wild	0	0	→	4	17
Hatchery	0	0	→	4	3
Total	0	0		8	20

State Water Project loss = salvage x 4.33; Central Valley Project loss = salvage x 0.68

CONFIRMED HATCHERY (ADIPOSE-FIN CLIPPED) CHINOOK SALMON LOSS AT THE SWP & CVP DELTA FISH FACILITIES as of 12/28/18

Release Date	CWT Race	Hatchery	Release Site	Release Type	Confirmed Loss	Number Released ¹	Total Entering Delta	% Loss of Number Released ²	% Loss of Total Entering Delta ³	First Stage Trigger
12/3/2018	LF	Coleman	Battle Creek	Spring Surrogate	5.20	61,277	n/a	0.008	n/a	0.5%
12/14/2018	LF	Coleman	Battle Creek	Spring Surrogate	2.6	66,266	n/a	0.004	n/a	0.5%

SWP and CVP adipose-fin clipped Chinook lost from 10/1/2018 through 12/27/2018.

¹Number released with the adipose-fin clipped and a coded-wire tag (CWT).

²% Loss of Number Released = (Confirmed Loss/Number Released)*100.

³% Loss of Total Entering Delta= (Confirmed Loss/Total Entering Delta)*100.

DWR-DES Revised 12/28/2018

Preliminary data from DFW, DWR, FWS, and Reclamation; subject to revision.

Agenda Item 7.

Winter-run JPE and fish loss density triggers

NMFS has determined that if the official JPE for winter-run Chinook salmon is not available by January 1, 2019, Action IV.2.3 should be implemented using the interim trigger values for the JPE-based triggers, as follows:

- The first stage interim action trigger is daily SWP/CVP older juvenile Chinook salmon loss density of 2.5 fish per TAF exported; exceedance would require OMR to be no more negative than -3,500 cfs for at least five days.
- The second stage interim action trigger is daily SWP/CVP older juvenile Chinook salmon loss density of 5.1 fish per TAF exported; exceedance would require OMR to be no more negative than -2,500 cfs for at least five days.

Agenda Item 8.

Hatchery Release

The U.S. Fish and Wildlife Service provided the following hatchery release notifications:

On 12/27/18, a notification for the planned release of approximately 173,000 brood year 2018 steelhead from Coleman National Fish Hatchery (CNFH) on 1/2/19 to 1/4/19, into the Sacramento River at Bend Bridge, 14 miles downstream of Battle Creek. This group is 100% marked (with an adipose-fin clip) and has an estimated average fork length of 195 mm.

Agenda Item 9.

DOSS Estimates of Fish Distribution

DOSS estimates of the current distribution of listed Chinook salmon as a percentage of the population, are based on recent monitoring data and historical migration timing patterns.

Location	Yet to Enter Delta (Upstream of Knights Landing)	In the Delta	Exited the Delta (Past Chippis Island)
<i>Young-of-year (YOY) winter-run Chinook salmon</i>	30-40% (12/18: 50-60%)	60-70% (12/18: 40-50%)	0% (12/18: 0%)
<i>Young-of-year (YOY) spring-run Chinook salmon</i>	88-90% (12/18: 96%)	10-12% (12/18: 4%)	0% (12/18: 0%)

Rationale for distribution

Wild winter-run Chinook:

35 wild winter-run Chinook salmon were observed at the GCID RST, 11 at Tisdale (half-cone sampling), 96 at Knights Landing, 24 at the beach seines, and 1 at Sacramento trawl. Since winter-run were observed at monitoring locations upstream and within the Delta and since the last DOSS estimate was from two weeks ago, DOSS estimates that an additional 20 percent of wild winter-run Chinook salmon population has migrated into the Delta. Since no winter-run were observed at Chippis Island, no wild winter-run Chinook salmon are estimated to have exited the Delta.

Wild spring-run Chinook:

8 wild spring-run Chinook salmon were observed at the GCID RST, 3 at Tisdale (half-cone sampling), 64 at Knights Landing, and 12 at the beach seines. Since more spring-run were observed at monitoring locations upstream and within the Delta and since the last DOSS estimate was from two weeks ago, DOSS estimates that an additional 6-8 percent of the population has entered the Delta.

Agenda Item 10.

DOSS Feedback on Entrainment Risk

DOSS provides weekly entrainment risk outlooks by considering (a) two different categories of entrainment risk based on listed fish distribution and (b) factors that influence their potential for entrainment. The two entrainment risk categories considered include:

- **Interior Delta Entrainment Risk-** fish in the Sacramento River that have the potential to be entrained into the Interior Delta through the Delta Cross Channel (when open) and/or Georgiana Slough; and
- **CVP/SWP Facilities Entrainment Risk-** fish in the Interior Delta that have the potential to be entrained into the CVP/SWP facilities.

Influencing factors considered include:

- **Exposure Risk** (both categories)- estimated scale (low, medium, high) of fish anticipated to be in vicinity of an entrainment risk,
- **Routing Risk** (Interior Delta Entrainment Risk)- estimated scale (low, medium, high) that flow split conditions could result in fish migrating into the interior delta instead of remaining in main channel, and
- **OMR/Export Risk** (CVP/SWP Facilities Entrainment Risk)- for fish in the Interior Delta, estimated scale (low, medium, high) that OMR and/or Export levels could result in entrainment into the CVP/SWP facilities.

To provide an overall assessment of entrainment risk, the estimated current status of these influencing factors are described below for each of the entrainment risk categories.

Interior Delta Entrainment Risk for listed salmonids in the Sacramento River over the next week:

- **Exposure Risk: MEDIUM**
 - Approximately 60-70% of winter run juveniles estimated to be in the Delta.
 - Central Valley steelhead are being released January 2-4 from Coleman National Fish Hatchery.
 - Expected storm this weekend into next week.
- **Routing Risk: LOW**
 - DCC is closed
- **Overall Entrainment Risk: LOW-MEDIUM**

CVP/SWP Facilities Entrainment Risk for listed salmonids in the Interior Delta over the next week:

- **Exposure Risk: MEDIUM**
 - Listed Chinook salmon have been salvaged and observed in monitoring sites in the Delta.
- **OMR/Export Risk:**
 - OMR -2,500 cfs: LOW
 - OMR -3,500 cfs: LOW
 - OMR -5,000 cfs: LOW-MEDIUM
 - OMR -6,250 cfs⁴: MEDIUM-HIGH
 - OMR -7,500 cfs⁴: MEDIUM-HIGH
 - OMR -9,000 cfs⁴: HIGH
- **Overall Entrainment Risk:**
 - OMR -2,500 cfs: LOW-MEDIUM
 - OMR -3,500 cfs: LOW-MEDIUM
 - OMR -5,000 cfs: MEDIUM
 - OMR -6,250 cfs⁴: MEDIUM-HIGH
 - OMR -7,500 cfs⁴: MEDIUM-HIGH
 - OMR -9,000 cfs⁴: HIGH

These assessments are based on current hydrology and fish distributions.

Agenda Item 11.

DOSS Advice to WOMT and NMFS: None

Agenda Item 12.

Next Meeting: The next DOSS conference call will be on **1/8/19 at 9am.**

⁴By request of management, DOSS also assessed risks at an OMR flow more negative than -5,000 cfs.